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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/643,461

08/18/2003

Qi Xiang

0180144

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10/21/2004

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EXAMINER

NGUYEN, JOSEPH H

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 10/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/643,461

Applicant(s)

XIANG ET AL.

Examiner

Joseph Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 6, 7, 9, 10, 13, 15, 16 and 19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6, 7, 9, 10, 13, 15, 16 and 19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 August 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of claims 1-3, 6-7, 9-10, 13, 15-16, 19 in the reply filed on 9/30/2004 is acknowledged.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 6, 9-10, 15-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Kubo et al.

Regarding claim 1, Kubo et al discloses on figure 1 a FET situated over a substrate 10, said FET comprising a channel 14 situated in said substrate; a first gate dielectric 19 situated over said channel, said first gate dielectric having a first coefficient of thermal expansion; a first gate electrode 18 situated over said first gate dielectric, said first electrode having a second coefficient of thermal expansion; wherein said

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second coefficient of thermal expansion is different than said first coefficient of thermal expansion so as to cause an increase in carrier mobility in said FET.

Note that the first gate dielectric is made of silicon oxide and the first gate electrode made of polysilicon. Therefore, the second coefficient of thermal expansion is different than said first coefficient of thermal expansion since the coefficient of thermal expansion depends on the material.

Regarding claim 2, Kubo et al discloses that said second coefficient of thermal expansion is greater than said first coefficient of thermal expansion.

Note it is well known in the art that the coefficient of thermal expansion of polysilicon is greater than that of silicon oxide.

Regarding claim 3, Kubo et al discloses on figure 1 said increase in said carrier mobility is caused by a tensile a tensile strain created in said channel 14.

Regarding claim 6, Kubo et al discloses on figure 1 said FET is a PFET.

Regarding claims 9-10, 15, 16, Kubo et al discloses on figure 1 all the structures set forth in the claimed invention.

Claims 1-3, 6, 9-10, 15-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Fitzgerald et al.

Regarding claims 1-3, 6, 9-10, 15-16, Fitzgerald et al discloses on figure 1 all the structures set forth in the claimed invention.

Claim Rejections - 35 USC § 103

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7, 13, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubo et al or Fitzgerald et al as applied to claims 1, 9 and 15 above.

Regarding claims 7, 13, 19, Kubo et al or Fitzgerald et al disclose substantially all the structure set forth in the claimed invention except said first coefficient of thermal expansion being greater than said second coefficient of thermal expansion. However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Kubo et al or Fitzgerald et al by having said first coefficient of thermal expansion being greater than said second coefficient of thermal expansion for the purpose of improving the performance of a FET device, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Conclusion

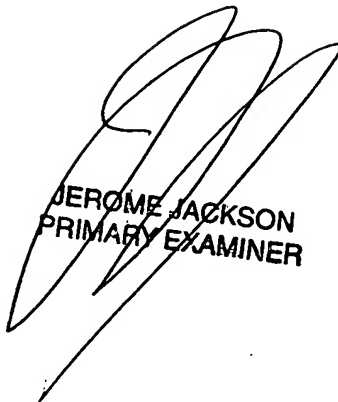
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (571) 272-1734. The examiner can normally be reached on Monday-Friday, 7:30 am- 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for

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the organization where this application or proceeding is assigned is (703) 872-9306 for regular communications.

JN

October 25, 2004.



JEROME JACKSON
PRIMARY EXAMINER